Multi-Point Communications Interface (MCI101)

RS-232 / RS-485 Converter Kit

INTRODUCTION

Using this RS-232 / RS-485 converter kit, you can connect the RS-232 serial port of a PC to POWERLOGIC, Modbus, or Jbus devices on an RS-485 daisy chain. To communicate to the devices, you must have installed on the PC, System Manager™ Software (SMS) from POWERLOGIC or other serial communication software.

This bulletin explains how to install and configure the MCI101 converter between the PC and the RS-485 daisy chain of a POWERLOGIC system. For systems other than POWERLOGIC, refer to the Black Box instruction manual included in the converter shipping carton.

PACKAGE CONTENTS

Table 1: Contents of the MCI101 converter kit

Item	Model / Type
RS-232/RS-485 Converter Kit	Black Box converter IC109A with attached power supply
Serial Communication Cable	Serial cable with a DB9-Female on one end and a DB25-Male at the other
RS-485 Communication Cable	POWERLOGIC cable CAB-108-NL

SAFETY PRECAUTIONS

⚠ WARNING

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

To avoid personal shock or damage to the electronic components of the converter, do not connect the power supply to the converter until you have made all connections as described in the bulletin.

Failure to observe these instructions can result in death or serious injury.

COMMUNICATIONS CONNECTIONS

Making the communications connections requires four main steps as described in the sections that follow:

1. Configure the converter.
2. Connect the CAB-108-NL cable to the converter.
3. Connect your serial field devices to the converter, using cable CAB-107 (not provided).
4. Connect the serial cable from the PC to the converter.

Configuring the Converter

Follow these steps to configure the converter:

1. Completely remove the thumbscrew on the bottom of the converter and remove the cover.
2. Set the configuration options for the converter as described in Table 2. Refer to Figure 1 for locations on the circuit board.

Table 2: RS-232/RS-485 converter setup options

Position	4-Wire Daisy Chain POWERLOGIC, Modbus, or Jbus	2-Wire with No Echo Daisy Chain Modbus or Jbus	2-Wire with Echo Daisy Chain Modbus or Jbus
W8	A–B (4-wire, full duplex)	B–C (2-wire, half duplex)	B–C (4-wire, full duplex)
W15	A–B (RTS/CD Enabled)	B–C (Data Enabled)	B–C (Data Enabled)
W17	B (7 msec)	D (0.7 msec)	D (0.7 msec)
DCE (XW1A) DTE (XW1B)	16-pin DIP shunt is shipped in position XW1A for DCE. *NOTE*: If not in this position, be careful not to bend the pins when moving the 16-pin DIP shunt from XW1B to XW1A. We recommend that you use an integrated circuit extraction tool.		
S2	ON		
S3	ON		
W5	A-B (RTS/CTS)		
W9	C (0 msec)		
W16	B (0.1 msec)		

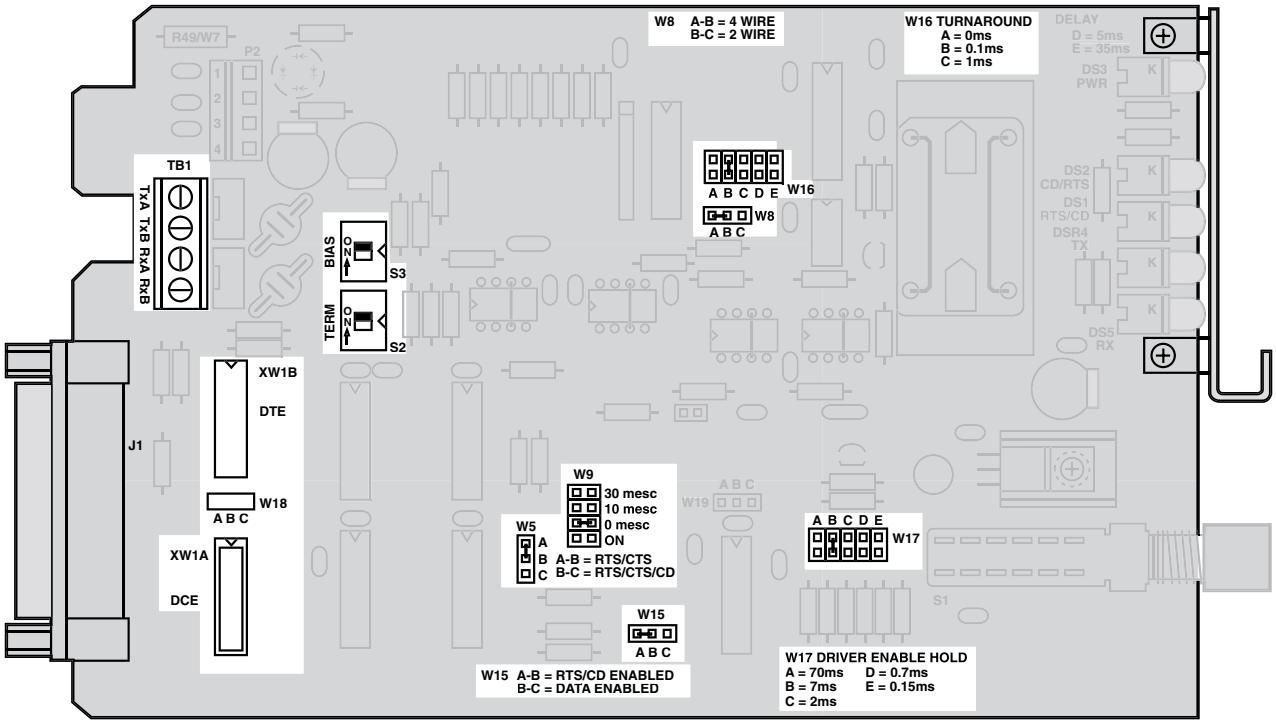

Figure 1: Circuit board layout

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Connecting the Cables

Depending on your system type, refer to Figure 2 or Figure 3 on page 4 and follow these steps to make the connections:

NOTE: For communication cable pinouts, refer to "Appendix A—Communication Cable Pinouts" on page 6. See "Appendix B—Comms Link Distance and Baud Rate Limitations" on page 7 for details on maximum baud rates and distances.

1. Connect the RS-485 cable (CAB-108-NL) to the converter. Do this by inserting the colored wires of the CAB-108-NL into the terminals of the TB1 connector on the converter circuit board.
2. Plug the male DB-9 end of the CAB-107 (not provided) into the female DB-9 end of the CAB-108-NL.
3. Wire the other end of the CAB-107 to the first device of the RS-485 daisy chain.

   NOTE: Refer to the instruction manual for the devices for information about RS-485 communication connections.
4. Plug the DB-9 female end of the serial cable into the serial port of the PC. Plug the DB-25 end into the RS-232 port of the converter.

4-Wire Devices

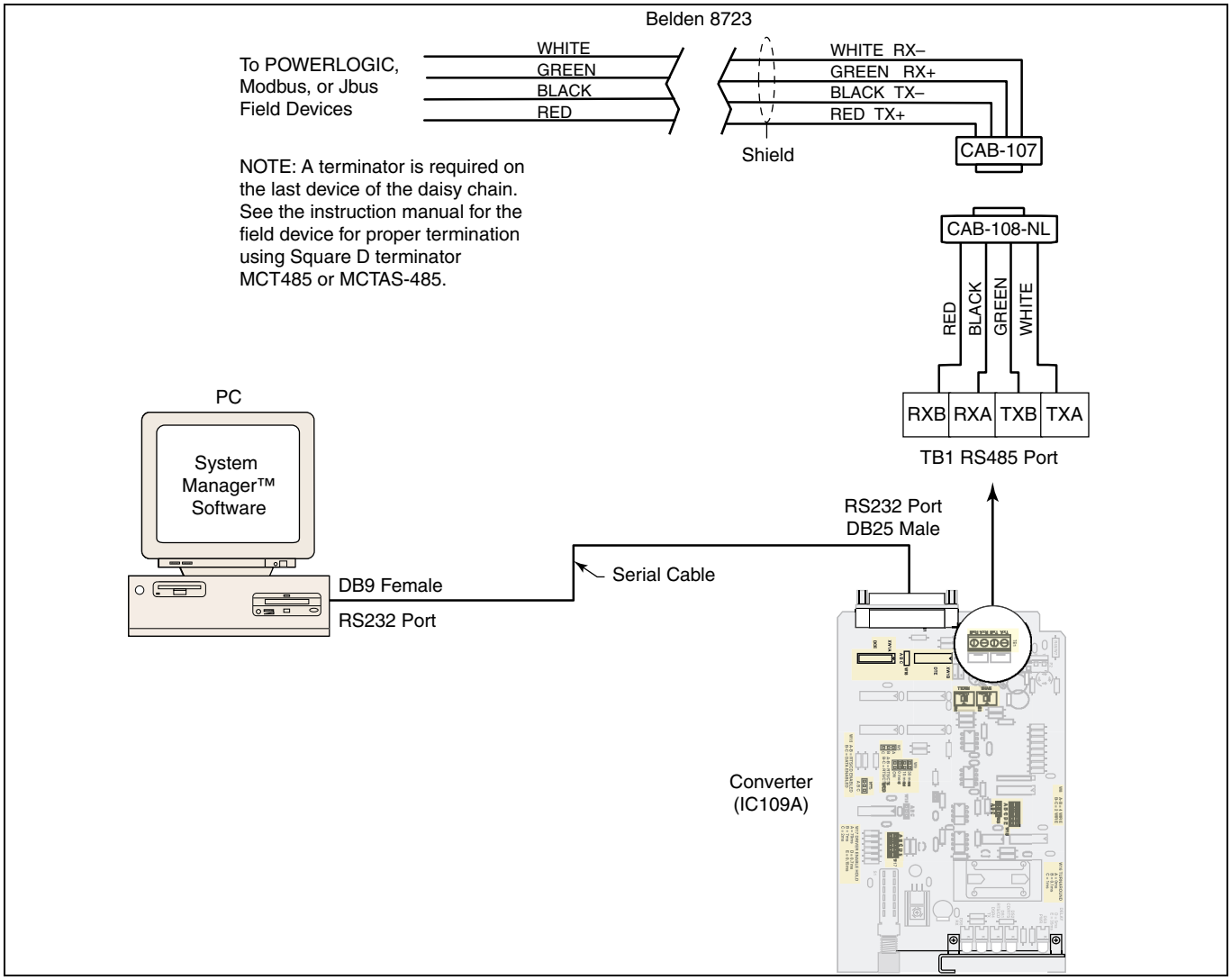

Figure 2: 4-wire, RS-485 network using IC109A converter

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2-Wire Devices

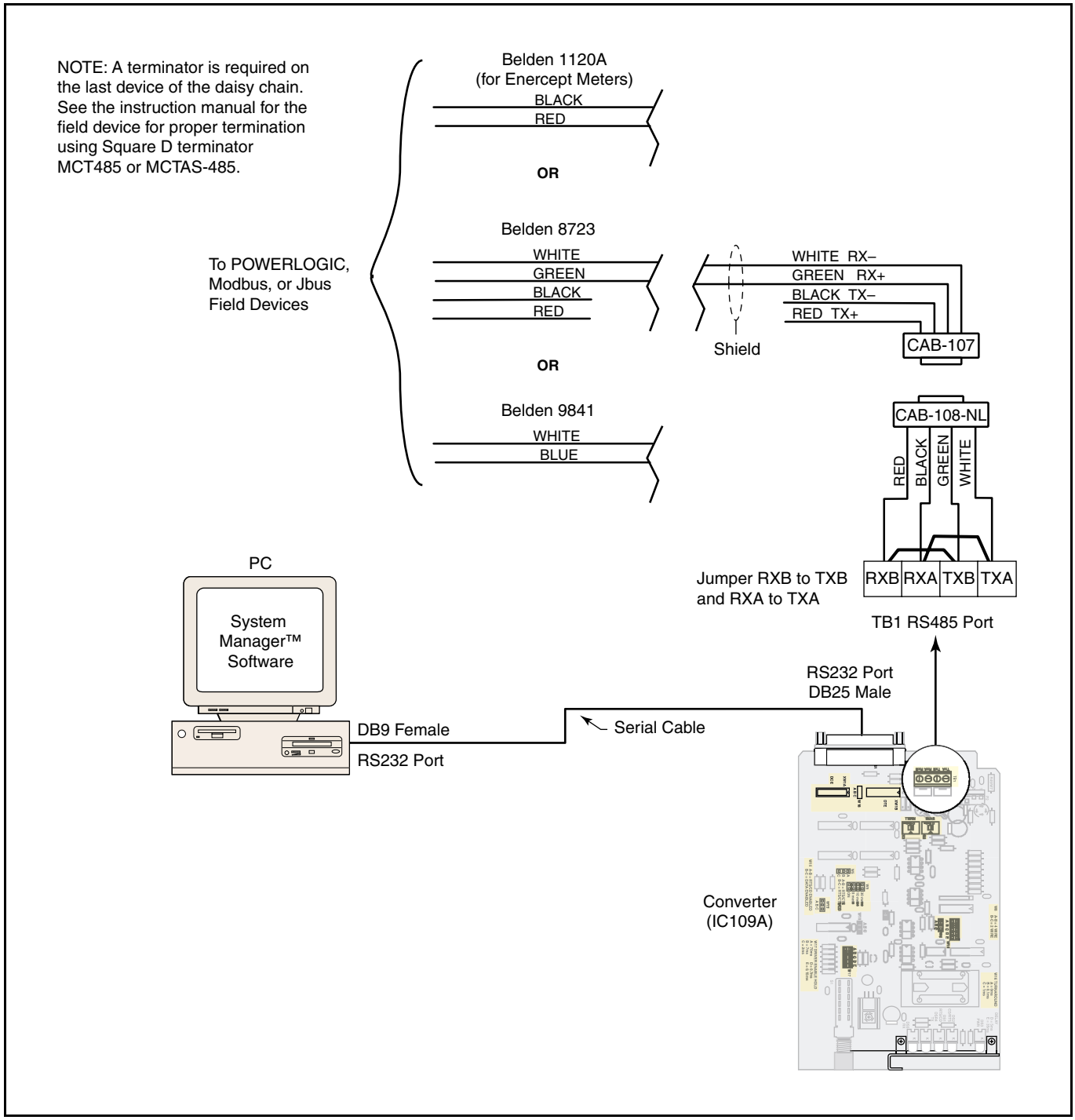

Figure 3: 2-wire, RS-485 network using IC109A converter

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OPERATION

After making all the connections, follow these steps:

1. Replace the converter cover and re-install the thumbscrew.
2. Plug the power supply of the converter into the outlet (120 Vac grounded receptacle).

   The power LED should light up and the converter is ready for communications.

To communicate with SMS, follow these steps:

1. Launch SMS.
2. Open an existing system or create a new system.
3. Add a communication connection (Setup > Communication Connection).
   a. For the communications connection name, type in a unique name for your MCI101 connection.
   b. For the communications driver, select “Serial driver.”
   c. Select the communications parameters.
4. After defining the communications connection, add the serial daisy-chained devices using the previously defined MCI101 communication connection.

   For more details, please refer to the SMS Help option in SMS by going to Help > SMS Help> Quick Start > Quick Start Serial Device Setup.
5. Once online with your SMS system, the converter LEDs (TX and RX) blink to indicate communications. If the LEDs are not blinking, check the configuration of each device in SMS and ensure communication wiring is properly connected according to the instructions in this bulletin.

TECHNICAL SUPPORT

To get technical support, contact the POWERLOGIC Technical Support Center:

Hours:	7:30 AM to 4:30 PM, Central Time, Monday through Friday
Phone:	615-287-3400 (leave a message after business hours)
Fax:	615-287-3404 (24 hours a day, 7 days a week)
Email:	PMOSUPRT@SquareD.com

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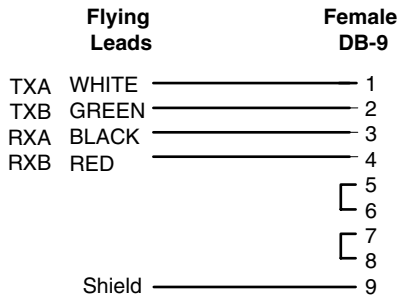
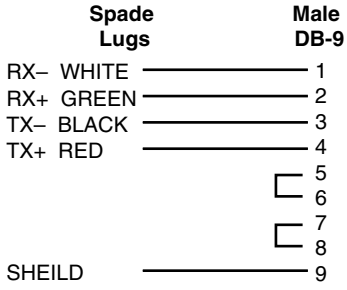
APPENDIX A—COMMUNICATION CABLE PINOUTS

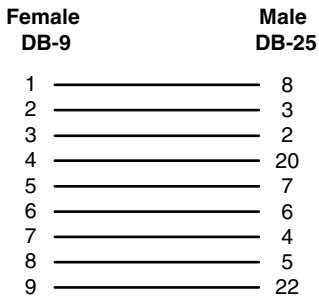
CAB-108-NL Cable 2 ft (.6 m)



CAB-107 Cable 10 ft (3 m)



9 PIN TO 25 PIN Serial Cable



CC-100 Cable 10 ft (3 m)

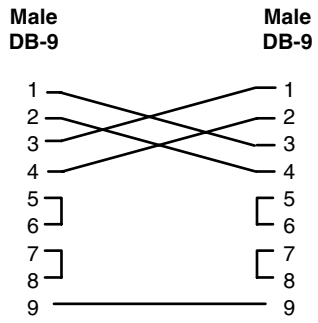


Figure 4: Pinouts

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APPENDIX B—COMMS LINK DISTANCE AND BAUD RATE LIMITATIONS

Tables 3 and 4 show the maximum distances of the communications link at different baud rates. The maximum daisy chain distance is determined by the baud rate and the types of RS-485 devices (2-wire / 4-wire) on the daisy chain. The distances are measured from the PC to the farthest device on the communications link.

Table 3: 4-Wire Daisy Chain Maximum Distances[1]

Baud Rate	Maximum distances	
	1–16 Devices	17–32 Devices
1200	10,000 ft (3,048m)	10,000 ft (3,048m)
2400	10,000 ft (3,048m)	5,000 ft (1,524m)
4800	10,000 ft (3,048m)	5,000 ft (1,524m)
9600	10,000 ft (3,048m)	4,000 ft (1,219m)
19200	5,000 ft (1,524m)	2,500 ft (762m)
38400	5,000 ft (1,524m)	1,500 ft (457m)

[1] Due to the volume of RS-485 devices in the field, this table is only to be used as a guide and was tabulated based on POWERLOGIC 4-wire devices and POWERLOGIC 4-wire devices that support 2-wire devices.

Table 4: 2-Wire Daisy Chain Maximum Distances[1]

Baud Rate	Maximum distances	
	1–8 Devices	9–16 Devices
1200	10,000 ft (3,048m)	10,000 ft (3,048m)
2400	10,000 ft (3,048m)	5,000 ft (1,524m)
4800	10,000 ft (3,048m)	5,000 ft (1,524m)
9600	10,000 ft (3,048m)	4,000 ft (1,219m)
19200	5,000 ft (1,524m)	2,500 ft (762m)
38400	2,500 ft (762m)	1,500 ft (457m)

[1] Due to the volume of RS-485 devices in the field, this table is only to be used as a guide and was tabulated based on POWERLOGIC 4-wire devices and POWERLOGIC 4-wire devices that support 2-wire devices.

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APPENDIX C—CONNECTING THE POWERLOGIC NETWORK INTERFACE MODULE (PNIM)

To connect to the POWERLOGIC Network Interface Module (PNIM) refer to Figure 5.

NOTE: For communication cable pinouts, refer to "Appendix A—Communication Cable Pinouts" on page 6. See "Appendix B—Comms Link Distance and Baud Rate Limitations" on page 7 for details on maximum baud rates and distances.

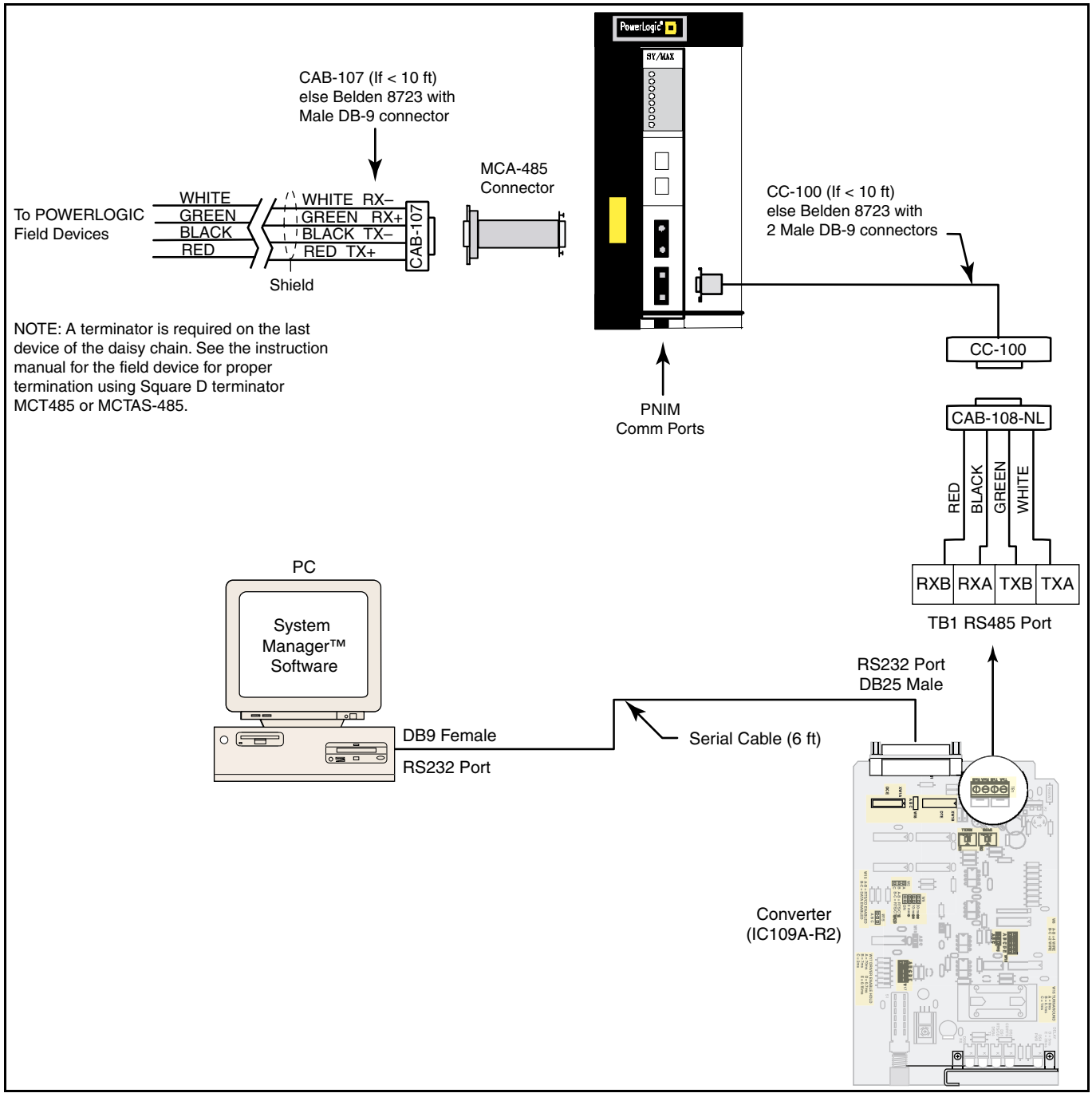

Figure 5: Converter connection to network interface module

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